BC HYDRO 2004 GREENHOUSE GAS REPORT

environmental

social

economic

Contents

2	Message from the President and Chief Executive Officer
3	Business of BC Hydro
4	2003 Highlights
5	Sustainability – BC Hydro's Climate Change Strategy
5	Reporting on Actions
6	Progress Report
10	Future Activities
11	BC Hydro's Greenhouse Gas Emissions for 2003
12	BC Hydro's 2003 Greenhouse Gas Inventory
14	Glossary

Revised March 2005

BC hydro

Message from the President and Chief Executive Officer

I am pleased to submit to the Voluntary Challenge and Registry (VCR Inc.) BC Hydro's ninth annual public greenhouse gas report documenting our greenhouse gas (GHG) management activities for the calendar year 2003.

BC Hydro is committed to managing business in a sustainable manner, in support of the three bottom lines – environmental, social and economic. In support of this commitment BC Hydro recently endorsed the long-term goal of no net incremental environmental impact resulting from our operations, which includes the management of greenhouse gases.

This report profiles specific measures and initiatives at BC Hydro that limit the growth of GHG emissions, including one of Canada's most aggressive energy conservation efforts, Power Smart; improving the efficiency of our facilities through our Resource Smart program; and clean energy purchases from independent power producers (IPPs). These initiatives have avoided significant amounts of GHG emissions, upwards of 25 million tonnes by the end of 2003!

BC Hydro first submitted an action plan to the Voluntary Challenge and Registry (VCR) in 1995 and has been reporting annually ever since. With the start of the VCR's recognition program in 1999, we have achieved gold- or silver-level champion reporter status each year. In 2001 BC Hydro received the VCR Inc. Leadership Award, recognizing our achievement in reducing and avoiding GHG emissions, conducting public outreach, investing in offsets, and demonstrating overall leadership in GHG management.

In light of recent developments in mandatory GHG reporting for Canadian industry to Statistics Canada, combined with the re-alignment of the VCR's business, BC Hydro will cease to produce an annual VCR report with this edition. BC Hydro will comply with national reporting requirements and will also prepare an annual report following the guidelines and standards of the Greenhouse Gas Protocol produced by the World Business Council for Sustainable Development and the World Resources Institute to provide a better picture of our progress on combating climate change.

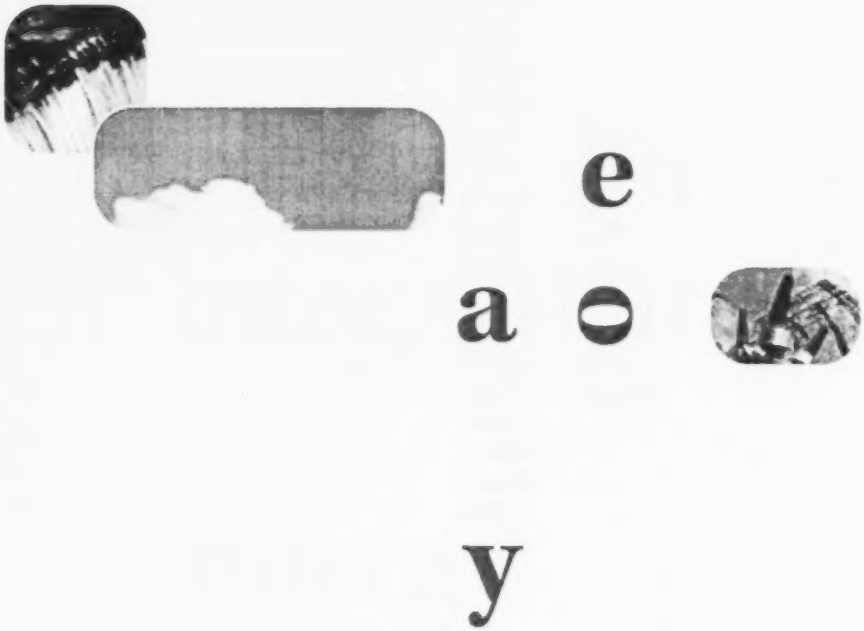
Yours truly,

Bob Elton

President and Chief Executive Officer

Business of BC Hydro

- BC Hydro is a commercial Crown corporation. Under the BC Hydro and Power Authority Act, BC Hydro is to generate, manufacture, distribute and supply power; upgrade its power sites; and purchase power from or sell power to a firm or person.
- BC Hydro's purpose is to deliver reliable power at low cost for generations. To fulfill this purpose BC Hydro has adopted fifteen long-term goals covering all aspects of the triple bottom line. Greenhouse gas emissions are included in the long-term environmental goal; *'No net incrimental environmental impact and reduce environmental impact of historical operations.'*
- BC Hydro has constructed an integrated system of 31 hydroelectric facilities, three thermal generation facilities and a number of small diesel generating stations in isolated "off-grid" areas that deliver over 11,000 megawatts of generating capacity. Between 43,000 and 54,000 gigawatt hours of electricity are generated annually.
- Greenhouse gas emissions vary with water supply as thermal generation increases or decreases. Electricity is delivered to 1.6 million residential, commercial and industrial customers, mainly through an interconnected system of nearly 73,000 kilometres of transmission and distribution lines.
- In 2002 the B.C. government released a new energy policy, *Energy for our Future: A Plan for B.C.* The policy stipulates that independent power producers will develop new electricity generation in the province, with BC Hydro restricted to improvements at existing plants. As a result, responsibility for electricity sector emissions in B.C. will begin to change, and BC Hydro will reflect this in the way its GHG inventory records and represents electricity-related emissions



2003 Highlights

Greenhouse gas emissions remain low in 2003

- Greenhouse gas emissions attributable to the electricity BC Hydro provides to customers remained relatively constant in 2003 at 1.16 million tonnes of CO_2e.
- A rejuvenated Power Smart energy conservation initiative continued to pay dividends in terms of 1.03 million tonnes of avoided GHG emissions this year. BC Hydro's Power Smart represents the majority of all Canadian demand-side management activities reported by the Canadian Electricity Association.
- The GHG benefits of the Green Energy program continued to flow, with power being supplied from an increasing number of Independent Power Producers to the BC Hydro grid.
- Overall, purchases of clean GHG-free electricity helped avoid 1.3 million tonnes of CO_2e this year.

Green Power Certificates open new market opportunities.

Green Power Certificates were launched in September 2002 as a pilot program. Phases 1 and 2 were completed on March 31, 2004 and GPCs became a permanent Power Smart offer on April 1, 2004. Green Power Certificates represent real avoided GHG emissions and provide another vehicle for customers to meet their GHG objectives.

green power certificates

Sustainability is BC Hydro's approach to climate change

BC Hydro is proud of the measures it has put in place, which produce multiple benefits: reduced emissions in the near term, a more robust generation system, lower costs and reduced liability under future GHG regulations mean success across all three bottom lines. BC Hydro believes this approach is a model of "sustainability thinking."

- **Power Smart** is a triple bottom line approach to curtailing demand for electricity. Demand-side management avoids significant GHG emissions, other environmental impacts and future liabilities, and helps to improve the competitiveness of our customers.
- **Resource Smart** makes the most of the large hydro and thermal generating resources we have today, with little or no incremental impact to the environment, and often with social, as well as financial, benefit.
- Purchasing B.C. **Clean Electricity** from Independent Power Producers encourages sustainable economic development while lowering GHG emissions.
- **Offsets** allow BC Hydro to utilize flexible market mechanisms that deliver the same environmental and societal benefit as an on-site reduction at less cost, leading to higher performance across all three bottom lines.
- **Integrated Energy Planning** will incorporate GHG emissions considerations into BC Hydro's long-term energy supply decision-making process.

BC Hydro's triple bottom line approach to meeting B.C.'s electricity needs ensures that the company is well positioned to enter an era of constraints on GHG emissions with manageable risk to our cost of energy and income.

Reporting on actions

BC Hydro is committed to providing regular reports that document annual GHG emissions and describe the actions taken to reduce and avoid GHG emissions. BC Hydro reports annual greenhouse gas emissions in our Annual Report on triple bottom line performance

In light of Canada's ratification of the Kyoto Protocol, emissions reporting requirements for companies will likely evolve to become more rigorous in the coming years. BC Hydro has a comprehensive GHG inventory and an excellent data archive that will assist in minimizing the costs of meeting GHG regulations and help identify cost-effective opportunities to achieve emission reduction targets. This means that BC Hydro is well positioned to mitigate the potential financial impacts from covenants or policies enacted to reduce GHG emissions in Canada.

BC Hydro will transition our voluntary reporting from Canada's Climate Change Voluntary Challenge and Registry format to the Greenhouse Gas Protocol published by the World Business Council for Sustainable Development and the World Resources Institute, beginning with the 2005 report on the 2004 emissions year.

Gold Champion Level Reporter

World Business Council for Sustainable Development

WORLD RESOURCES INSTITUTE

Progress Report
Action Taken

Power Smart

In 2003 BC Hydro estimates that 1.03 million tonnes of greenhouse gas emissions were avoided through a suite of Power Smart programs. Power Smart avoids GHG emissions by putting off the need for new electricity generation in B.C.

Highlights from Key Power Smart Initiatives in 2003

Compact Fluorescent Light give-away

In October 2003 BC Hydro launched a compact fluorescent light (CFL) bulb program, one in a series of Power Smart programs and initiatives, and an extension of a program offered from October 2002 to March 2003 on Vancouver Island. Every residential customer in the Lower Mainland, Sea-to-Sky corridor and the Sunshine Coast was sent a voucher for two free ENERGY STAR® labelled CFLs

to encourage the conversion of their light bulbs to a more energy-efficient technology. CFLs use up to 75 per cent less energy than regular incandescent bulbs to produce the same amount of light and last about eight times longer. This program became part of the Conservation Challenge, a partnership between BC Hydro and the Greater Vancouver Regional District (GVRD) whereby both parties formally challenged GVRD residents to take specific actions related to energy and water efficiency and the protection of air quality. As of January 2004, the response to the program was excellent, with over 300,000 light bulbs given away. Many customers received more than two free CFLs as a result of supplementary offers from manufacturers and retailers. Due to the success of the program, it was extended to northern and southern B.C. communities in the summer of 2004.

Case Study: Seasonal Light-Emitting Diode Program

The Challenge

During the holiday season, residential lighting electricity use increases as a result of seasonal holiday lighting. Traditionally, seasonal holiday light strings have used incandescent light bulbs, which are less energy efficient than newer lighting products on the market.

In an effort to reduce lighting electricity use during the holiday season, BC Hydro promoted the use of seasonal light strings using light-emitting diodes (SLEDs). These new lighting products consume approximately 95 per cent less electricity than traditional incandescent light strings and last up to seven times longer. In fact, the lights are so energy efficient that if every B.C. household replaced one incandescent seasonal light string with a SLED, over $730,000 in combined energy costs would be saved for the year.

Prior to 2003, however, the market for SLEDs was virtually non-existent. SLEDs were not available in Canadian stores, and there was a limited supply worldwide. In order to move the seasonal lighting market toward SLEDs, BC Hydro Power Smart faced the challenge of building awareness among retailers and consumers of the benefits of SLEDs, creating demand, and ensuring that enough product was available to meet the demand.

The Solution

During the 2002 holiday season, BC Hydro started taking steps to build interest in the new technology. Hydro acquired product from a selected manufacturer and promoted SLEDs through earned media and community events, raising awareness and creating demand for the new lights throughout B.C.

Progress Report *(continued)*

Building on the awareness and publicity generated in 2002, BC Hydro promoted SLEDs to national retailers before the January/February 2003 ordering period, and worked with manufacturers and retailers to bring the lights to market for the 2003 holiday season. To stimulate sales, BC Hydro partnered with Natural Resources Canada and manufacturers to offer consumers a $5 mail-in rebate on SLEDs during the 2003 season through newspaper advertising and in-store and on-line coupons.

The Results

During the 2003 holiday season, consumers bought over 400,000 SLED light strings.

The majority of retailers sold out their inventory of SLEDs.

Over 52,000 rebate coupons were redeemed, an unprecedented redemption rate for a coupon offer.

The program generated evaluated annual energy savings of 8,700,000 kWh with a peak reduction of 52.8 MW.

The Outcome

Without the intervention of BC Hydro Power Smart, it is unlikely that SLEDs would have appeared in Canadian retail stores within this decade. Now, however, a market for SLEDs has been established in B.C. The positive response to SLEDs on the part of customers, retailers and manufacturers has marked the beginning of a market transformation toward energy-efficient seasonal lighting.

Case Study: Refrigerator Buy-Back Program

The Challenge

Thousands of B.C. households have a second, older, inefficient refrigerator, which is often under-used. An inefficient refrigerator can consume over 1,600 kilowatt hours of electricity every year, costing the owner up to $100 a year to operate.

However, most customers were not aware that their second refrigerators were so wasteful and costly to operate, did not have the resources needed to dispose of the refrigerators and were not motivated to do so.

The challenge facing BC Hydro Power Smart was to reduce energy waste by removing inefficient refrigerators from circulation.

The Solution

To encourage customers to give up their second operating refrigerators, BC Hydro Power Smart launched a Refrigerator Buy-Back Program. Participants receive a $30 rebate and free pick-up of their inefficient, second refrigerators, and the components are recycled in an environmentally sound manner.

The program had been offered for a few years in the '90s until reduced volume made it uneconomic. However, research showed there was again a demand, and a program was re-launched on Vancouver Island in 2002/2003. After retrieving over 6,000 refrigerators, Hydro launched the Refrigerator Buy-Back Program province-wide in September 2003. The program was supported by newspaper, radio and on-line advertising, as well as by retailer partnership programs designed to increase awareness and drive participation in the program.

The Results

Since 2001, BC Hydro has recovered over 31,000 second operating fridges. Since 1989, BC Hydro has recovered over 190,000 second operating fridges. The program achieved 60 per cent of its 2003/04 annual target in its first four months.

Since 2001, the program has generated annual savings of 26,000,000 kWh with a peak reduction of 3 MW.

The Outcome

B.C. consumers are now more aware of the benefits of disposing of inefficient appliances and of investing in energy-efficient technologies.

Progress Report *(continued)*

Green and Clean Energy

BC Hydro has been actively pursuing green energy since our first green energy call went out in 2000. BC Hydro has adopted EcoLogo™ certification under the Environmental Choice Program for our green energy. These criteria will replace BC Hydro's own green criteria as the standard for future green energy calls. ECP is a third-party standard of choice for certifying environmentally perferable electricity generation in Canada.

In 2003 BC Hydro announced the purchase of electricity from 16 new green generating facilities to be built, owned and operated by Independent Power Producers. The successful projects consist of 14 hydro, one landfill gas and one wind energy. When operational, the projects combined will provide close to 1,800 gigawatt hours (GWh) of new electricity to the BC Hydro grid, roughly equivalent to the amount of electricity used by 180,000 homes. Since 2000 BC Hydro has acquired approximately 3,000 GWh per year from all our green energy calls.

BC Hydro also purchases clean energy from B.C.-based IPPs. The current Energy Plan for B.C. has a Clean Energy target that applies to BC Hydro. It stipulates that 50% of new energy must come from clean sources.

Green Power Certificates

For leading businesses and organizations that want to demonstrate their sustainability focus, BC Hydro piloted a green power product called Green Power Certificates. In 2003 over 9,000 Green Power Certificates were sold. Each represents the environmental and social benefits, including emission reductions, from one megawatt hour of green power generation over and above BC Hydro's corporate energy portfolio commitments. Thanks to the leading organizations that purchased Green Power Certificates during the two-year pilot and because of expected growth in sales in upcoming years, BC Hydro has committed to offer Green Power Certificates on an ongoing basis. The over 40 purchasers in fiscal 2004 included such diverse organizations as Overwaitea Food Group's Changes Recycling Centres, Envision Credit Union, Emily Carr Institute of Art & Design, and the Greater Vancouver Regional District. Green Power Certificates are also marketed through BC Hydro's trading arm, Powerex, to customers outside British Columbia.

Resource Smart

BC Hydro's Resource Smart Program is intended to increase operating efficiency at existing generation facilities through upgrades and retrofits. Increased efficiency enables BC Hydro to postpone the construction of new generation facilities and achieves savings of greenhouse gas emissions. The annual Resource Smart Program energy gains achieved to date total 2,730 GWh per year.

Implementation of Resource Smart Programs during 2003 made it our biggest year ever. During April to December 2003, 429 GWh per year of new energy and 31 GWh per year of restored energy were brought into service through the implementation of five projects.

The 429 GWh per year energy gained during 2003 represents the amount of electricity needed to supply about 42,900 B.C. households.

Progress Report *(continued)*

Other Efforts

Sulphur Hexafluoride Management

Sulphur hexafluoride (SF_6) gas is used to insulate and protect transmission equipment. This potent GHG can escape from worn or leaking seals or other equipment components, or through routine handling. Started in 1999, BC Hydro's SF_6 management program is now fully operational, and involves detailed tracking of SF_6 losses from equipment and follow-up equipment repairs or replacements. The total losses of SF_6 in 2003 were 3.26 tonnes, equivalent to 77,000 tonnes of GHGs.

- Ten older circuit breakers were replaced with modern equipment. The new breakers still operate with SF_6 but use less than half the quantity of SF_6 contained in the older equipment. In addition, modern equipment has a leakage rate of less than 0.5%.
- During the decommissioning, precautions were taken to recover as much of the gas as feasible using modern gas recovery equipment. Nevertheless, the equipment decommissioning did result in some losses of SF_6 to atmosphere and these have been included in the 2003 loss inventory.

management

Future Activities

BC Hydro is well positioned to continue avoiding GHG emissions and to mitigate the potential financial impacts of impending GHG regulations.

Power Smart – As GHG regulations become reality, it is expected that the value of BC Hydro's past energy efficiency efforts will be recognized and that future efforts to avoid fossil fuel-fired generation through demand-side management will receive regulatory recognition under any GHG reduction targets. BC Hydro's long term goal for conservation is to *'Develop and foster a conservation culture in BC that leads to customers choosing to make a dramatic and permanent reduction in electricity intensity.'*

B.C. clean energy – BC Hydro has surpassed its voluntary Renewable Portfolio Standard (10% of new supply through 2010 from green resources), and expects to exceed the goal of 50% of new supply from B.C. clean resources as well. This is the most aggressive clean energy portfolio standard that BC Hydro is aware of in Canada and it's expected to position the company well in a carbon-constrained future. Greenhouse gas regulations will need to allow electric utilities to choose clean energy as a way to meet their GHG targets, thus allowing them to reduce emissions while promoting sustainable economic development.

Stepped rates – One of the components of the provincial *Energy Plan* is direction to implement a stepped rate structure for transmission voltage customers. The intent of the stepped rate structure is to reflect the increased cost of meeting increasing demand through new resources and provide pricing signals that will encourage large industrial customers to conserve electricity or generate electricity from their own operations. The new rate structure will also support retail access opportunities for IPPs by allowing large customers to choose suppliers other than BC Hydro for a portion of their load.

Net metering – Net metering is a program that allows customers with their own generation to "bank" their excess electricity with their electric utility. In the simplest type of net metering, the customer has a single meter that runs forward when the customer is using electricity supplied by the utility. The meter runs backwards when the customer is "exporting" excess electricity to the grid. BC Hydro is currently exploring options for allowing net metering to occur in its system.

Hydrogen refuelling technology – Over the next decade, hydrogen-fuelled vehicle travel will be supported as Powertech Labs, a BC Hydro research and development subsidiary, demonstrates that hydrogen fuelling stations will be both economical and efficient. With support from BC Hydro, Stuart Energy Systems and Dynetek Industries, Powertech Labs has initiated the Compressed Hydrogen Infrastructure Program (CH_2IP).

The CH_2IP's vision is to demonstrate the technical feasibility of high-pressure gaseous hydrogen fuelling stations. This will set the standard for construction and operation of high-pressure hydrogen fuelling stations and will provide the basis for commercialization of hydrogen fuelling station infrastructure. Through the successful development of CH_2IP, Powertech believes it will accelerate the introduction of the emission-free fuel cell vehicle.

Powertech Labs Inc. – This BC Hydro subsidiary is continuing research into reclamation and release abatement of SF_6. A novel technique for the purification of SF_6 contaminated with air using semi-permeable membranes has been successfully tested on a laboratory scale. Also, initial experiments using pressure swing adsorption have demonstrated the ability to purify and recover contaminated gas. This work continues, with the target being a field portable purification and recovery unit that will enable SF_6 purification on site, thereby eliminating the associated handling and shipping costs. This will also reduce the losses and venting of SF_6 from handling. Research into release abatement has also demonstrated the potential of collecting SF_6 gas that is normally vented into the atmosphere during routine sampling for gas quality, safety and diagnostics.

BC Hydro's Greenhouse Gas Emissions for 2003

GHG Emissions

In keeping with standard international practice, BC Hydro quantifies its GHG emissions on a calendar-year basis.

- Domestic emissions remained low at approximately 1.16 million tonnes. This includes emissions from BC Hydro generating facilities, BC Hydro operations (fleet, buildings, SF_6), and IPP facilities selling electricity under contract to BC Hydro.

BC Hydro's GHG emissions intensity, the measure of emissions per unit of production, was correspondingly low, at 22 tonnes per GWh.

Avoided Emissions

Power Smart = 1.03 million tonnes

- 2,381 GWh from legacy (previously existing) programs.
- 438 GWh from programs this year

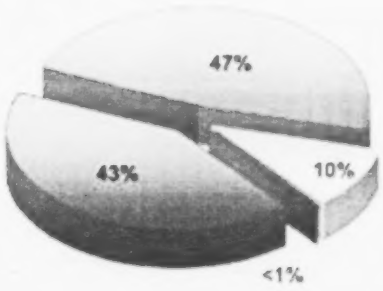
Resource Smart = 476 thousand tonnes

- New energy gains totalled 1,181 GWh (combines this year's gains with those from previous years)

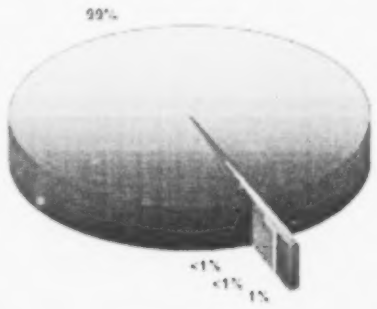
Clean Energy = 1.30 million tonnes

- Purchase of 4,309 GWh of B.C. Clean Energy

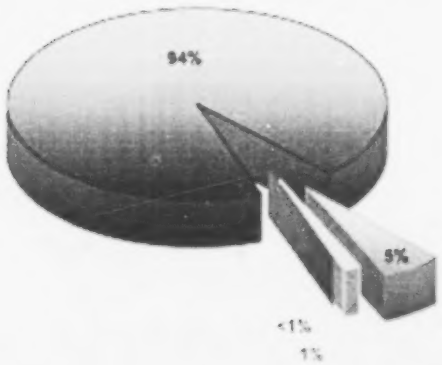
Electricity Purchased by BC Hydro



Electricity Generated by BC Hydro



Electricity Sold by BC Hydro



- Hydro
- Natural gas
- Woodwaste
- Diesel

BC Hydro's 2003 Greenhouse Gas Inventory

					Predicted Emissions Information	
	Base year*	1995	2000	2003	2005	2010
Avoided Emissions						
Customer efficiency programs	0.29	0.33	1.01	1.03	1.52	1.90
Purchase of cleaner power	0.59	0.31	0.83	1.30	1.35	1.78
Internal efficiency improvements	0.11	0.10	0.29	0.48	0.57	0.70
Total Avoided Emissions	**0.99**	**0.74**	**2.13**	**2.81**	**3.44**	**4.39**
Actual Emissions						
BC Hydro facilities (incl. buildings and fleet)	1.38	2.34	1.93	0.36	0.80	1.18
B.C.-based independent power producers	0.01	0.32	0.30	0.81	0.95	2.56
Total Actual Emissions	**1.39**	**2.66**	**2.23**	**1.16**	**1.74**	**3.74**
Emissions if No Action Taken	**2.38**	**3.40**	**4.36**	**3.97**	**5.18**	**8.13**
Offsets						
Applied to Island Cogeneration Project	0.00	0.00	0.00	(0.26)	(0.32)	(0.32)
Sold or used internally	0.00	0.00	0.00	0.26	0.32	0.32
Avoided Emissions	**(0.99)**	**(0.74)**	**(2.13)**	**(2.81)**	**(3.44)**	**(4.39)**
Net Emissions	**1.39**	**2.66**	**2.23**	**1.16**	**1.74**	**3.74**
GHG Intensity (t/GWh)	**35**	**61**	**46**	**22**	**33**	**72**

All amounts in millions of tonnes of carbon dioxide equivalent unless otherwise indicated.

* BC Hydro uses the 5-year average of 1989–1993 as its base year in order to correct for variable water levels during that period.

BC Hydro's Historic Greenhouse Gas Emissions and Water Supply

Glossary

carbon dioxide equivalent (CO_2e): standard measure for GHG emissions, expressing the global warming potential of various gases over 100 years in terms of carbon dioxide equivalents. In this report, one tonne of methane is assumed to have 21 times the atmospheric impact of one tonne of CO_2 and is expressed as 21 tonnes CO_2e; nitrous oxide (N_20) is 310, and SF_6 is 23,900.

greenhouse gas (GHG): gases that trap heat in the atmosphere; they include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20) and sulphur hexafluoride (SF_6).

GHG intensity: a measure of the amount of emissions released during the generation of a given amount of energy; usually measured in tonnes of CO_2e per GWh.

GHG offset: project that compensates for GHG emissions from one source by lowering, avoiding, or sequestering (capturing and storing) emissions at another source.

gigawatt hour (GWh): one billion watts (one thousand kilowatts) of electric power, supplied or produced for one hour; BC Hydro measures the output of a generating station in kilowatts (kW).

hydroelectricity: electricity produced by harnessing the power of falling water or streamflow.

independent power producer (IPP): operator of a privately owned electricity generating facility, usually connected to a utility's transmission system to sell electricity.

inflow: water flowing into a reservoir.

kilotonne (kt): 1,000 metric tonnes.

sulphur hexafluoride (SF_6): a greenhouse gas used as an insulating and protective gas in transmission equipment.

tailrace: the portion of a waterway immediately below a dam.

thermal generation: generation of electricity by converting heat energy into electric energy; generation through burning of fossil fuel or biomass (e.g., woodwaste).

Voluntary Challenge and Registry (VCR) Inc.: a non-government organization that encourages Canadian companies to voluntarily reduce GHG emissions and report on their progress

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